

P a t e n t   c l a i m s

1.

An apparatus for disintegrating degradable or non-degradable material, wherein the apparatus has a functional unit in the form of a rotatable knife unit driven by a motor (2) via a mechanical power transmission device (7) which comprises as part thereof a flywheel (8),

characterised in

- that the functional unit has knife blade (51) which on rotation in a chamber (4) is designed to move along a chamber wall, wherein at least a part of the wall has perforations; and
- that the mechanical power transmission device (7) comprises a mechanism in the form of a clutch (9) which provides sudden power engagement with coupling device (10) and thence with the knife unit (1).

15

2.

An apparatus as disclosed in claim 1, characterised in

- that the power engagement takes place when the flywheel (8) in the mechanism reaches a predetermined rotational speed.

20

3.

An apparatus as disclosed in claim 1 or 2, characterised in

- that said mechanism is designed, in the event of the functional unit jamming or a predetermined working resistance being exceeded, to be deactivated by at least partial disconnection of the transmission of power from the power transmission device to the rotational mass of the knife unit.

25

4.

An apparatus as disclosed in claim 1, 2 or 3, characterised in

- that the mechanism is centrifugal force controlled.

30

5.

An apparatus as disclosed in claim 3 or 4, characterised in

- that the mechanism is designed to be deactivated either by reversing the normal rotational direction of the motor, or on cessation of the rotation of the flywheel, or in that the rotational speed of the flywheel is below a predetermined disengagement threshold.

35

6.

An apparatus as disclosed in claim 1, 2, 3, 4 or 5, characterised in

- that the engagement time of the mechanism as a function of the rotational speed of the flywheel is adjustable.

7.

An apparatus as disclosed in one or more of claims 1-6, characterised in

- that the coupling device consists of an adjustable slip coupling.

8.

An apparatus as disclosed in one or more of the preceding claims, characterised in

- that the mechanism is designed, when a certain rotational speed of the flywheel has been reached, to cause a sudden engagement between the flywheel and the further mechanical transmission to the functional unit via the coupling device.

9.

An apparatus as disclosed in one or more of the preceding claims, characterised in

- that the rotational energy of the functional unit alone accounts for 2-50% of the total rotational energy represented by the motor, the power transmission device including the flywheel, and the knife unit.

10.

An apparatus as disclosed in one or more of the preceding claims, characterised in

- that said knife blade forms an angle with the rotational axis of the functional unit.

11.

An apparatus as disclosed in one of more of the preceding claims, characterised in

- that said knife blade is replaceable and/or adjustable.

12.

An apparatus as disclosed in one or more of the preceding claims, characterised in

- that the functional unit consists of a hub from which arms project, which at their outer end form a mount for said knife blade.

13.

An apparatus as disclosed in claim 12, characterised in

- that the hub and the arms are moulded in a single piece of a lightweight material, e.g., aluminium or reinforced plastic.

5

14.

An apparatus as disclosed in claim 12, characterised in

- that the hub and the arms are formed of two moulded, identical, joinable parts of a lightweight material, e.g., aluminium or reinforced plastic.

10

15.

An apparatus as disclosed in one or more of claims 1-14, characterised in

- that the mechanism comprises one or more movable, spring-loaded engagement blocks which are mounted on a guide device (28', 28", 29', 29", 32, 33); and
- 15 - that the block or blocks are designed, through centrifugal force during the increasing rotation of the flywheel, to move radially outwards either gradually or suddenly, and on said predetermined rotational speed, to engage with engagement means, e.g., a block or blocks on a rotating part (37) of the coupling device, e.g., a rotating plate, which forms a further connection to the functional
- 20 unit.

16.

An apparatus as disclosed in one or more of the preceding claims, characterised in

- 25 - that said knife blade is designed on rotation along the chamber wall to move past at least one counter-knife (54) mounted on the chamber wall.

17.

An apparatus as disclosed in claim 16, characterised in

- 30 - that the position of the counter-knife is adjustable.

18.

An apparatus as disclosed in claim 15, wherein at least one pair of blocks is used, characterised in

- 35 - that the guide device consists of an articulated arm device common to the pair of blocks whose articulated arms are pivotally fastened to the flywheel.

19.

An apparatus as disclosed in claim 15, characterised in

- that there is provided at least one pair of diametrically arranged engagement blocks.

20.

An apparatus for the transmission of power from a motor (2) to a functional unit (1) via a flywheel (8) which forms a part of a power transmission device (7), characterised in

- that the transmission device (7) comprises as part thereof a mechanism (9) in the form of a clutch (9) which has means for sudden power engagement with a coupling device (10), and wherein the clutch mechanism (9) forms further connection with the functional unit; and
- that said mechanism (9) consists of one or more movable engagement blocks (28, 29), which, spring-loaded, are mounted on a guide device (28', 28'', 29', 29'', 32, 33).

21.

An apparatus as disclosed in claim 20, characterised in

- that power transmission to the functional unit (1, 4) is designed to take place when the rotational speed of the flywheel (8) passes a defined threshold value; and
- that the block or blocks are designed, through centrifugal force during the increasing rotational speed of the flywheel, to move radially outwards either gradually or suddenly, and on said predetermined rotational speed, to engage with engagement means (37', 37''), e.g., a block or blocks on a rotating part (37) of the coupling device (10), e.g., a rotating plate, which is a part of the power transmission device (7) and which forms further connection to the functional unit (1).

22.

An apparatus as disclosed in claim 21, characterised in

- that said mechanism is deactivatable either by reversing the normal rotational direction of the motor, or on cessation of the rotation of the flywheel, or in that the rotational speed of the flywheel is below a predetermined threshold value.

23.

An apparatus as disclosed in claim 20, 21 or 22, characterised in

- that the engagement time of the mechanism is adjustable as a function of the rotational speed of the flywheel.

5

24.

An apparatus as disclosed in claim 20, wherein at least one pair of blocks is used, characterised in

- that the guide device consists of an articulated arm device common to the pair of blocks whose articulated arms are pivotally connected to the flywheel.

10

25.

An apparatus as disclosed in claim 20, characterised in

- that there is provided at least one pair of diametrically arranged engagement blocks.

15

26.

An apparatus as disclosed in one or more of claims 20-25, characterised in

- that the coupling device comprises an adjustable slip coupling.

20

27.

An apparatus as disclosed in one or more of claims 20-26, characterised in

- that the mechanical transmission engagement or disengagement of the flywheel is centrifugal force based.

25

28.

An apparatus as disclosed in one or more of claims 20-27, characterised in

- that the power transmission device is designed, in the event of a predetermined working resistance being exceeded, to cause at least partial deactivation of said mechanism for disconnection of power transmission from the device to the functional unit;
- that said deactivation involves the flywheel with its rotational energy being mechanically disconnected from the coupling device; and
- that said disconnection of the rotational energy of the flywheel is centrifugal force controlled.

30

35

29.

Use of an apparatus as disclosed in one or more of claims 1-28 in order, with the aid of said motor-driven functional unit, to disintegrate or compact articles selected from the group consisting of:

- 5 a) articles in the form of packaging, for example, bottles, cans, beverage cartons, trays or boxes, and accessories for same;
- b) articles made of plastics material, glass, light metal or thin metal, e.g., tin;
- 10 c) articles of biologically degradable material, for instance, wood, plants, plant debris, paperboard, starch-based material and cellulose-based material;
- d) packaging of biologically degradable material selected from paperboard, starch-based material and cellulose-based material.

30.

- 15 A use as disclosed in claim 29, for handling or processing articles in a reverse vending machine.